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Beyond one-size-fits-all: Personalising health communication to drive real behaviour change



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ABSTRACT

Health communication is central to prevention and care, yet generic messages frequently fail to achieve real behaviour change. Personalisation offers a way forward by aligning health information with individual characteristics. This chapter examines why one-size-fits-all approaches are limited, how tailored strategies can improve engagement and adherence, and what challenges must be addressed to ensure equity and trust. We also discuss how emerging technologies, including large language models, create new opportunities for scalable, evidence-based personalisation. Ultimately, we argue that personalised health communication is not a refinement but a strategic necessity for improving outcomes across healthcare systems.

1. Introduction

Health communication functions as a key determinant of prevention and care outcomes, shaping how people understand risks and benefits and translate such information into concrete health behaviours. When this process falls short, the consequences are immediate and measurable: for example, a study found that approximately 50% of the information provided to patients was forgotten immediately, and half of what was recalled was incorrect [1]. Such findings underscore the fragility of communication in healthcare: even when accurate information is provided, much of it can be lost or distorted before it guides behaviour.

Regardless of the form of health communication, be it via mass media or in medical consultations, it is crucial that people receive information in a way they can understand and act on. However, the understanding and impact of a given message vary depending on each and every individual's characteristics [2]. The central challenge, therefore, is to help individuals make health-promoting choices while taking into account the fact that all humans are different. In this article, we argue that a large share of the shortcomings in health communication today can be traced to the use of generic messages: without adequate adaptation, messages rarely achieve the levels of understanding, retention, and action required for meaningful health outcomes.

Addressing these shortcomings requires moving from universal messages to personalised communication. This can improve health outcomes by enhancing adherence in a broad sense (i.e., covering therapeutic adherence as well as preventive practices such as regular screening or check-ups). Note that the effects of personalisation can operate through

different pathways: for instance, at the interpersonal level [8], personalisation can foster greater trust in patient–provider relationships, while at the population level it can increase comprehension of public health messages [29].

Of course, the idea of adapting communication to specific audiences is not new. In fact, practitioners, whether institutions or physicians, routinely adjust the way they speak, explain, or frame information in order to be understood. What we propose in this article goes beyond such intuitive adjustments, by clarifying what evidence-based personalised communication is, why it is worth implementing, and how to implement it in the health field.

2. The double-edged impact of communication in health

2.1. Health communication as a driver of prevention and adherence

Why is health communication important? Because it is one of the few levers available to address two persistent challenges in healthcare: the need to strengthen prevention and the widespread problem of non-adherence to treatment.

First, health prevention, whether primary (avoiding disease onset), secondary (detecting and treating disease at an early stage), or tertiary (limiting complications and relapse), cannot be effective without communication. Public health recommendations (e.g., ‘stop smoking’, ‘increase physical activity’, ‘attend screening programs’, ‘get vaccinated’) only achieve their purpose if individuals receive, understand, and act upon them. Evidence shows that well-designed communication campaigns can

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significantly improve prevention behaviours. For instance, a narrative review of the literature demonstrates that large-scale mass media interventions, evaluated through quasi-experimental designs, have been associated with reductions in smoking prevalence, promoting healthier diets, and encouraging physical activity [3]. The review highlights how tobacco control campaigns, assessed via before-and-after measures, interrupted time series, and geographic comparisons (states or regions with and without media exposure) consistently show declines from 5% to 20% in smoking rates over multi-year campaigns.

Second, communication is also crucial for treatment adherence, a determinant of health outcomes that remains chronically insufficient across health systems [4]. As early as 2003, the World Health Organization reported that in industrialized countries only about half of patients with chronic diseases adhered to their prescribed regimens. More recent studies confirm the persistence of this issue: for example, among women with metastatic breast cancer, one-third reported nonadherent behaviours, which were significantly associated with declines in well-being [5]. In the case of early-stage breast cancer, a systematic review of 14 studies showed that poor adherence to endocrine therapy was linked to up to a twofold higher risk of relapse or death [6]. These findings highlight adherence not as a marginal concern but as a decisive factor for survival, recovery, and quality of life.

Communication does not act in isolation but operates through multiple pathways, for instance by shaping patients' understanding of their condition, reducing uncertainty, fostering trust, and supporting shared decision-making. Among these pathways, the quality of the patient-provider relationship is a particularly important mediator. Effective interactions with physicians and healthcare teams are linked to greater treatment adherence, better self-reporting of conditions or symptoms, and improved patient engagement in care [7,8]. Satisfaction with care (largely influenced by communication, interpersonal skills, and the clarity of information) has been shown to translate into behavioral responses that directly affect adherence and, ultimately, health outcomes [9]. For example, in patients with hypertension, higher satisfaction with physician-patient communication is associated with better medication adherence and self-care behaviours, which are linked to improved disease management [10].

Taken together, the evidence suggests that communication (whether through population campaigns or clinical interactions) should not be seen as optional for care and rather a central determinant of its effectiveness. By improving adherence through relational factors (such as trust and therapeutic alliance) and motivational factors (such as intention and perceived self-efficacy), communication influences not only individual health outcomes but also system-level outcomes, including service use and the overall efficiency of care delivery, leading to better quality and equity of healthcare delivery.

2.2. The limits of communication in health

Although communication has the potential solution to improve patient care, it can also contribute to the problem. For instance, poorly executed communication can lead to numerous negative outcomes, such as stigmatization, or reactance from the audience [11]. The issue we focus on in this article can be summarized as follows: communication does not always fit the patient, who may thus fail to understand or engage with the message. This misfit can arise for at least three reasons: mass messages that ignore individual diversity, mismatches between physicians and patients, and the influence of unconscious biases.

First, health communication most often fails to acknowledge the specific characteristics of the receivers (i.e., the patients). In communication, each party brings their unique characteristics (e.g., their needs, values, attitudes, physical and emotional abilities and disabilities, language capacities) all of which influence the manner in which messages are received. This is why universal messages risk missing their purpose, as captured by the adage "one size does not fit all". For example, a mass media campaign promoting healthy eating may be effective for highly

educated audiences who can easily process nutritional information, but largely ineffective—or even alienating—for groups with lower health literacy or different cultural food practices [12].

Second, at a smaller scale, there can be a mismatch between the sender (e.g., the doctor) and the receiver (e.g., the patient). This can be due to several reasons, having to do with their training or their personality. For example, a study comparing personality differences between medical graduates and the British adult population found that doctors were more likely to rely on intuition, focusing on broad abstract patterns rather than precise concrete details to process information, and to base their decisions primarily on logic and objective criteria rather than values [13]. Such differences may affect communication processes between medical professionals and their patients, as they do not share the same modes of information processing, potentially leading to misunderstandings.

Finally, practitioners might try to adapt their communication, but they often rely on their own intuitions, which are subject to biases, rather than on evidence-based adaptation processes. This may lead to ill-adapted messages and counterproductive communication. For instance, like all individuals, healthcare practitioners might apply biases or stereotypes to their audience. Most healthcare providers in the US exhibit positive attitudes toward white individuals and negative attitudes toward people of color [14]. This bias was significantly related to patient-provider interactions (e.g., length of the consultation, collaboration between consultations, verbal dominance), treatment decisions (e.g., treatment for pain management), treatment adherence, and patient health and mental health outcomes [14]. In this specific example, communication is indeed adapted but not in a way that reflects invalid assumptions, thereby reinforcing disparities instead of reducing them. This highlights the need for personalisation strategies grounded in validated frameworks, which not only prevent maladaptive intuitive judgments but can also help correct embedded biases by guiding clinicians toward more accurate, equitable forms of adaptation.

A further illustration comes from gender bias in medical care. As Bajos noted, men and women often hold distinct conceptions of the body. Men tend to have a "mechanistic" view of the body, perceiving it primarily in terms of functionality and performance, akin to a machine. In contrast, women have a more holistic or integrated view of their bodies, encompassing not only functionality but also lived experience, appearance, and emotional and social aspects [15]. Consequently, women often provide longer and more detailed expressions of their symptoms and their social consequences, leading health professionals to interpret them as atypical [16]. This contributes to the misdiagnosis of myocardial infarction among women, as they tend to highlight tiredness over functional symptoms such as chest pain [17]. As a result, patients may differ by gender in the way they report symptoms, or won't consult a physician in the same stage of the same pathology. In mixed-gender consultations, communication may be biased if practitioners rely solely on their own perspective.

These examples highlight that the same message can produce divergent effects across recipients, and that improving impact requires to properly match the message to the recipient. Importantly, this does not imply that clinicians treat patients as interchangeable: rather, the literature shows that although practitioners routinely adapt their communication, this adaptation is often guided by intuition, stereotypes, or salient but irrelevant characteristics, rather than by validated predictors of patients' understanding, motivation, and decision-making.

3. Personalisation as a solution

3.1. What is personalised communication?

To address the persistent problems of misunderstanding, disengagement, and bias, communication needs to be systematically adapted to the characteristics of its recipients. This is precisely the promise of personalised health communication.

In everyday life, individuals instinctively adapt their communication style to their audience, for example, by modifying their tone of voice when speaking to infants [18], adjusting their volume and acoustic characteristics of the sentences when addressing elderly or hearing-impaired individuals [19], or choosing words based on the receiver's sensitivity or expected language proficiency [20]. In these examples, two sets of variables come into play: the characteristics of the receiver (e.g., age, hearing aptitudes, language proficiency) and the characteristics of the message, both framing and content (e.g., volume and tone of the elocution, choice of words). These intuitive calibrations are based on information gathered during contact.

In the context of health communication, a similar alignment must be sought between the message and its receiver. Adaptation is possible at the different scales of communication, from large-scale campaigns to interpersonal communications. Public health campaigns can target subgroups of the population that are disproportionately affected by specific determinants. For example, in most industrialized countries, smoking prevalence is higher among low socio-economic populations (e.g. in France see [21]). Campaigns promoting tobacco cessation may therefore adapt their messages to better persuade those groups. Research has shown that some strategies are particularly effective. For instance, emotionally evocative advertisements and advertisements that contain personalised stories about the effects of smoking and quitting are particularly promising for encouraging smoking cessation among smokers from low and middle socio-economic backgrounds as compared to those from high socio-economic status as compared to those from high socio-economic status? or for everyone? [ja2]added [22]. These findings were based on data from the UMass Tobacco Study, a longitudinal survey of Massachusetts adults conducted between 1999 and 2002, during which >130 different anti-tobacco television advertisements were aired. They found that each additional 10 potential exposures to emotionally evocative or narrative ads resulted in a 14% increase in the odds of quitting smoking at follow-up, and this effect was more pronounced among those from lower socioeconomic status. The authors hypothesize that these messages are particularly effective to these smokers, who are initially more resistant to information from the health sector, as they convey health information in a way that is difficult to discount, natural and easy to process, and emotionally engaging, thereby increasing perceived susceptibility to smoking-related diseases and

motivation to quit. This approach illustrates the principle of targeted campaigns, in which communication aims to reach and persuade a subgroup of the population.

Nevertheless, despite its effectiveness [23], this approach is based on the assumption that the population segments will be impacted uniformly by the same messages, which may limit its effectiveness, as it overlooks individual characteristics that can play a key role in how messages are received [24,25]. Personalised communication takes this strategy further by delivering messages to a single recipient following an individual assessment [25]. This strategy is costly, as it requires an assessment phase and case-by-case implementation (see Figure 1). Thus, when trying to reach a large audience, a trade-off between targeted and tailored approaches must be found. However, in the context of a medical consultation, the constraints are less prohibitive, as an assessment must be carried out for each patient. In this interpersonal setting, adaptation can be fine-tuned if performed well.

3.2. How personalisation enhances the criteria for effective communication

Why would matching the messages to its recipient enhance their effectiveness? Classical communication models highlight five fundamental criteria that ensure effective communication: attention, understanding, acceptance, retention, intention to act [26]. If all those criteria are met, it can then lead to effective behaviour change. Importantly, these criteria are not independent; each represents a prerequisite for the next. A message must first capture attention to be processed, comprehension then enables acceptance, acceptance facilitates retention, and only retained information can ultimately motivate action. Personalisation, by tailoring messages to the characteristics of recipients, has been shown to strengthen each of these stages [30].

A health message, in the context of a mass media campaign or during in person consultations, can influence each of these levers independently, and it is important to recognize two key features of this process. First, the criteria are not dichotomous but continuous: individuals can be more or less attentive, more or less persuaded, more or less willing to act. Even modest gains at any stage can increase the likelihood of behavioural adherence. Second, the criteria can be targeted separately. A message may be designed primarily to capture attention without necessarily

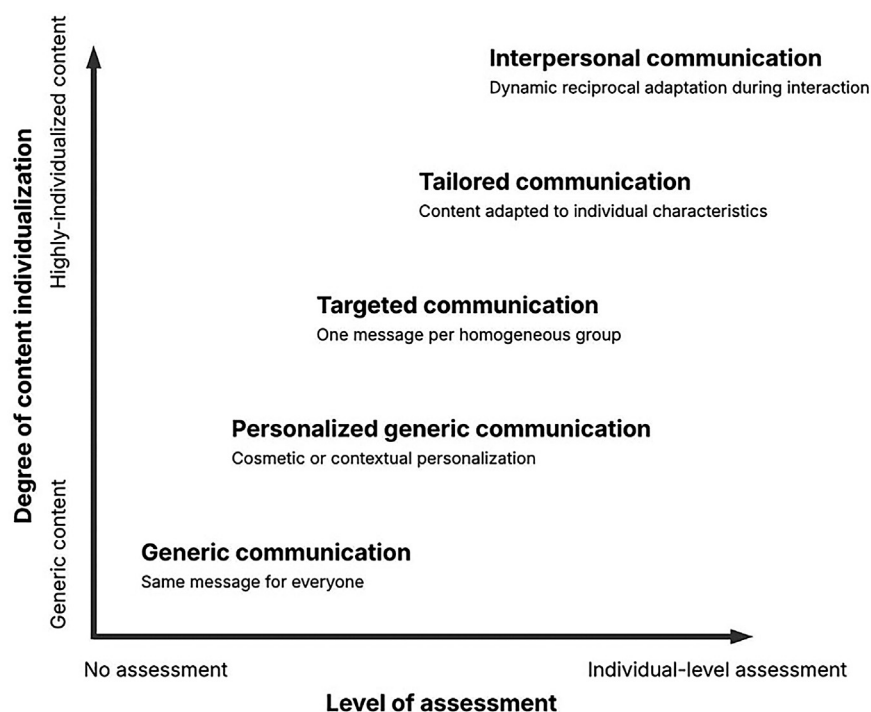


Fig. 1. Classification of the different approaches of health communication by level of content personalisation (inspired by [24]).

fostering acceptance, or conversely, to strengthen the translation of information into behavioural intention without significantly altering comprehension. These distinctions matter, because they imply that different personalization strategies can be deployed depending on whether the goal is to make a message more noticeable, more understandable, more credible, more memorable, or more actionable.

The following sections illustrate how personalisation can strengthen the effectiveness of health communication across this sequential process, thereby increasing the likelihood that communication will translate into concrete health behaviours.

- Personalisation can increase audience attention.

First, a message that fails to capture attention will have minimal or no impact. It is therefore unsurprising that one of the primary goals of tailoring is to increase attention. This is typically achieved by signaling to the recipient that the message reflects their specific attributes, preferences, or needs [27]. A message that directly reflects the recipient's situation by stating "this message is just for you !" or by including cues about their characteristics (such as gender or student status) captures attention as recipients may wish to explore information to a familiar situation. For example, an email aiming at reducing fat intake has a better chance of being read if it takes into account the actual dietary of the recipient compared to an email providing a generic advice [28]

- Personalisation can allow for better comprehension.

Once attention is captured, the message must also be understandable to have an effect. Lexical and semantic adaptations can enhance message comprehension, as well as the use of imagery. Literacy levels vary widely across populations, meaning that healthcare providers cannot use the same vocabulary or sentence structures for all patients. Another dimension along which individuals vary is their personality. For instance, individuals differ in their need for cognition [29]: some prefer more complex messages with detailed information, as this may enhance their sense of understanding. Therefore, some patients may require detailed explanations of the mechanisms of a medical procedure (e.g. mammography and breast cancer), to feel they fully understand it, while others may be overwhelmed by details and would feel more comfortable with a broad and illustrative explanation of the same treatment [30].

- Personalisation can enhance message acceptance.

Comprehension, however, does not guarantee acceptance: a message must be credible, persuasive, and aligned with the recipient's beliefs and motivation. Persuasion depends on several factors, including perceived personal relevance [31]. Some individuals spontaneously connect messages to their own lives, while others require explicit cues—for instance, asthma treatments framed in terms of physical activity will resonate with active patients but arguably less so with sedentary ones, who need alternative examples. Pre-existing beliefs also play a key role [32]: people are more receptive to messages consistent with their views and skeptical of opposing arguments. In their seminal study on biased assimilation, individuals with opposing views on capital punishment were exposed to the same empirical evidence but selectively accepted findings consistent with their prior beliefs while discounting contradictory results, which ultimately led to more polarized attitudes. Although this example concerns a societal policy debate, it highlights a general mechanism of selective message acceptance that is directly relevant to health communication, insofar as the framing of information can interact with recipients' prior beliefs to shape how health messages are interpreted and accepted.

- Personalisation can create more durable retention of a message.

Retention is strongest when a message resonates with a recipient's concerns or lived experiences. Neuroimaging evidence shows

that tailored messages trigger greater activation in memory-related brain networks than generic ones [33], suggesting that personalisation leaves a more durable cognitive trace. This durability is crucial for prevention and treatment messages whose relevance emerges later: for instance, antibiotic-resistance campaigns are effective only if remembered weeks or months afterward, when flu-like symptoms appear. Messages that connect to individuals' interests or past experiences are more likely to persist in memory and resurface at the right moment to guide behaviour. Rather than relying solely on precise timing, which is difficult to achieve in public health, personalisation allows messages to remain effective by lasting in memory until the appropriate moment.

- Personalisation fosters greater behavioural intentions.

Finally, and most importantly, tailored messages have been shown to intensify intention to act. As highlighted in a meta-analytic review, personalised health communication increases intention to change behaviour by $r = .14$ [34]. The scope of the change in intention elicited by tailored communication can differ depending on the type of personalisation implemented. The magnitude of this effect, while remaining small, can vary depending on the type of personalisation implemented. For instance, a more recent meta-analysis on motivation matching found an effect of about $r = .20$ [35]. To illustrate, a person with an individualist mindset is less likely to change their intention to be vaccinated if vaccination is presented as a contribution to collective immunity, rather than a protection for oneself. This example illustrates how tailoring messages to psychological orientations can significantly enhance their persuasive impact.

While an intention-behavior gap persists (i.e., many individuals who form an intention to change their behavior fail to translate it into action), intention remains the strongest proximal predictor of behavior, accounting for about 20–30% of the variance in actual behavior, as shown in a meta-analytic synthesis of meta-analyses spanning diverse behaviours (e.g. condom use) and theoretical frameworks of behaviour change [36]. This makes enhancing motivation to act a critical step for improving health outcomes. Tailoring messages, through the sequential process depicted above, plays an important role in strengthening behavioural intentions. However, intention should be understood as a necessary but not insufficient condition for treatment adherence: while adherence cannot occur in the absence of intention, the translation of intention into sustained adherence is strongly shaped by other factors, such as habit formation and contextual constraints. Strengthened intentions may nonetheless increase the likelihood of downstream outcomes, such as adherence to treatment or to medical recommendations [37] or, greater engagement with healthcare services (such as screening attendance [38]). Evidence further indicates that tailored communication produces modest but consistent effects on actual health behaviours (e.g., tobacco consumption, physical activity, dietary behaviour, screening, etc.), showing that its impact extends beyond intention alone [34]. Still, the effectiveness of personalised health communication ultimately depends on how personalisation is designed and implemented in practice.

4. How to implement personalised communication in practice ?

The different examples exhibited previously highlight two important aspects: the significance of assessing audience characteristics and using scientifically validated correspondences in crafting messages.

4.1. Identifying recipient characteristics

The first step in tailoring communication is to assess relevant characteristics of the message recipient, namely the patient in a healthcare setting. Various types of characteristics can be pertinent, but they differ in how easily they can be measured. Sociodemographic data are usually

Table 1
Types of audience characteristics used for tailoring communication.

Dimension	Examples / Subcategories	References
Sociodemographic factors	Age, gender, education, occupation, income, cultural background, country of birth	[39]
Health literacy & cognition	General literacy, numeracy, working memory, abstract vs. concrete thinking styles	[11]
Emotions & affective states	Anxiety, stress, depression, optimism, fear, hope	[40]
Goals & motivational orientations	Promotion vs. prevention focus (regulatory focus theory)	[40]
Attitudes & functions	Cognitive vs. affective basis; knowledge vs. value-expressive functions	[40]
Values & moral foundations	Individualism vs. collectivism, fairness, authority, purity, liberty	[41]
Personality traits	Big Five dimensions (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism)	[40]
Identity & social roles	Social identity (e.g., parent, worker, minority group), self-concept, life stage	[40]
Psychological orientations	Independent vs. interdependent self-construal, tight vs. loose cultures	[40]
Contextual constraints	Characteristics independent to the audience: time availability, financial resources, healthcare access, social support	[35]

collected, particularly in the context of a medical consultation, and include variables such as gender, age, occupation, and country of birth; they have proved useful for tailoring. However, more precise personalization can be achieved when more specific and complex information about the recipient is available. Some of these different characteristics have been widely studied and, for most of them, validated tests have been designed (see Table 1).

However, in practice, healthcare professionals and public health practitioners do not have the time or resources to administer such instruments. Some characteristics can be inferred through direct interaction with the recipient. For example, a clinician can sometimes perceive signs of anxiety or distress during a consultation without the need for a standardized, validated questionnaire. Yet, this kind of inference carries risks as intuitive judgments may be influenced by individually or socially constructed biases, leading to inaccurate assessments and misaligned communication strategies. It is therefore essential that practitioners remain aware of their own potential biases and use them with caution, supplementing intuition with evidence-based frameworks whenever possible.

Once these characteristics are assessed, empirically or through a test, the critical next step is to apply this knowledge effectively. This means selecting the message design, content and framing that are most likely to resonate with the recipient.

4.2. The characteristics of the message, content and framing

Understanding the characteristics of the receiver is only one side of the personalisation process. To be effective, communication must also consider the other side: the features of the message itself. Personalisation is not simply about knowing *who* the recipient is, but about deciding *what* in the message can be adapted—its content, its framing, its tone, or its format—to better align with the recipient's profile and increase the likelihood of achieving the intended health goal.

Message attributes are generally analyzed along two dimensions: framing and content. While content refers to the substantive information conveyed (e.g., the necessity to quit tobacco), framing determines how this information is presented. Framing can involve tone (e.g., fearful, friendly, cooperative), argument orientation (e.g., prevention vs. promotion), and lexical choices (e.g., “smoking” vs. “tobacco consumption”). The same content can therefore be articulated in multiple ways, such as “Quit tobacco,” “You should stop smoking,” “When will you cease your tobacco consumption?” or “I can help you quit smoking.” Each variation conveys the same underlying message but activates different cognitive and emotional responses. In the context of mass media campaigns, framing options multiply further, as additional modalities come into play—visual style (graphic images vs. cinematic production), narrative format (testimony vs. fiction), or textual design. This multiplicity illustrates why message design is a complex task: it requires not only deciding what to say but also how to say it in a manner that is persuasive, contextually appropriate, and tailored to diverse audiences.

In contrast to framing, which alters how information is presented, content determines what information is conveyed in the first place. In

health communication, the content of a message can focus on medical outcomes (e.g., the health benefits of quitting smoking), financial considerations (e.g., the money saved by not buying cigarettes), or social and moral implications (e.g., the responsibility not to support harmful industries). Additional themes such as social norms, justice, freedom, youth protection, and attractiveness can also be mobilized. More recently, prevention research increasingly draws on the commercial determinants of health, pointing to how harmful industries shape behaviour and outcomes through marketing, lobbying, and profit-driven practices [42].

For each type of argument, different frames can be used, leading to an infinity of messages to encourage tobacco cessation. Messages may highlight health benefits (content) with compassion (frame) (e.g., “if you quit, we will have many more years together”), financial loss (content) with shameful framing (e.g., “hundreds of euros wasted on cigarettes”), or use moral indignation (frame) to emphasize the exploitative practices of the tobacco industry (content) (e.g., “every cigarette supports an industry that profits from illness and harms the planet”).

4.3. Matching message and audience

Personalisation is about understanding how to effectively connect the target characteristics with the message features. This matching process is crucial, because without evidence-based correspondences between recipient characteristics and message design, adaptation risks being arbitrary or even counterproductive. The challenge, therefore, is not only to personalise but to personalise well, by hypothesising and testing which combinations of traits and message features maximise attention, comprehension, persuasion, retention, intention, and ultimately health behaviour change.

A substantial body of research, spanning domains as varied as purchase intention [43], political persuasion [44], voting behaviour [45] and health related behaviour change [35], offer useful guidelines. Much of this work focuses on framing (how information is presented), as this approach can be applied across a broad range of issues. In contrast, the matching of specific arguments to audience profiles tends to be more outcome-specific.

Some matching principles are relatively self-evident. For instance, within the regulatory focus paradigm Cesario and al. [46] demonstrated that aligning the message frame with the recipient's motivational style increases persuasion. In their experiment, they exposed participants to messages about healthy nutrition. The messages were framed either in a eager style, emphasizing benefits and potential achievement (“A diet rich in essential nutrients, like those found in fruits and vegetables, has direct effects on the biochemistry of the brain, resulting in increased energy, better moods, and a general sense of happiness and fulfillment.”) or in a vigilant way, stressing safety and the avoidances of losses (“Eating fruits and vegetables supplies the body with the nutrients it needs, enabling the body to produce substances from within which buffer it from the physical demands of the world we live in (pollution, daily stress, bad weather, etc.).”). Results showed that participants were significantly more persuaded when the

framing of the message matched their regulatory orientation: promotion-focused individuals responded more favorably to eager framing in intention to change diet and perceived persuasiveness of the message, whereas prevention-focused individuals were more convinced by vigilant framing.

Similarly, research on attitude bases shows that individuals with cognitive-based attitudes are more influenced by facts, data and logical arguments (i.e. appeal discussing the ingredients and manufacturing processes of a beverage), whereas those with affective-based attitudes are more receptive to emotional appeal, narratives or sensations (i.e. appeal discussing the taste and smell of a beverage) [47]. Comparable patterns are observed with the self-construal framework which describes how individuals define themselves in relation to others: people with independent self-construal (i.e., defining themselves in terms of personal attributions and goals) respond better to autonomy-focused messages, while those with an interdependent self-construal (i.e., defining themselves through their relationships and social roles) prefer messages highlighting relationships and collective well-being [48]. With those examples, the importance is to identify the characteristic of the audience, as the matching is consistent.

Other matching methods are less obvious and require an intermediary step to frame the message effectively. A large corpus of research has been conducted to match messages with personality, defined through the Big Five model [49,50], a widely used empirical framework describing personality through five dimensions - Extraversion, Neuroticism, Conscientiousness, Agreeableness and Openness (see Box 1). For example Chen and Lee [51] demonstrated that individuals high on Emotional Stability (low Neuroticism), Openness, and Extraversion respond more positively to messages emphasizing hedonic benefits (pleasure and enjoyment) whereas those scoring high on Agreeableness and Conscientiousness are more influenced by messages stressing utilitarian value. Dadoo and Padovano combined the prevention-promotion focus with product framing (utilitarian vs. hedonic) and found that preventive messages about utilitarian products were particularly persuasive for individuals high in Extraversion, Openness and Neuroticism [52]. Fear appeals have also received considerable attention. Evidence suggests that individuals with high levels of Neuroticism are less likely to be persuaded by fearful messages, and may engage in defensive or avoidance strategies [53].

Box 1 The Big Five Framework and Personalisation

The Big Five personality framework clusters everyday descriptors of human behaviour into five empirically derived dimensions—Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism—each measured on a continuous scale. Openness captures curiosity and a preference for novelty; Conscientiousness reflects organisation, diligence and self-control; Extraversion involves sociability and energy; Agreeableness indicates compassion and cooperativeness; and Neuroticism indexes emotional instability.

Twin studies show that these traits are partly heritable, with genetic influences explaining roughly 40–60% of variance [54], and longitudinal work indicates that individuals maintain their relative standing on them across decades despite gradual maturation [55]. In other words, personalities are stable enough to inform predictions yet malleable enough to be shaped by interventions [56].

Beyond its descriptive utility, the Big Five functions as an encompassing organizing framework that mitigates the proliferation of redundant psychological scales. Meta-analytic evaluations demonstrate that approximately 71% to 83% of stand-alone constructs, such as Grit or Self-Efficacy, are significantly redundant with the Big Five, correlating as strongly with these five domains as the traits' own internal facets [57].

This structural robustness allows practitioners to treat personality as a primary determinant of behavioural outcomes. For instance, Conscientiousness has emerged as a decisive factor in

rule compliance; individuals high in this trait are significantly more likely to adhere to institutional mandates and regulatory guidelines [58]. Furthermore, personality traits act as critical buffers against environmental pressures. Empirical evidence shows that high levels of Extraversion and Openness can moderate the negative impact of life stress, preventing the degradation of productive behaviours during periods of high distress [59].

Specific studies investigated how different persuasive strategies vary in their effectiveness across multiple health domains for people with distinct personality traits. Ndulule showed that competition works well for individuals with high levels of Openness, Agreeableness and low levels of Neuroticism, but it is ineffective for individuals high in Extraversion. They also reported that rewards decreased motivation among individuals high in Neuroticism but were effective for those high in Agreeableness, Openness and Extraversion [60]. Other studies indicate that scarcity strategy, displaying a product as scarce so that people would feel obliged to buy last items, resonates with extroverted people, that commitment is effective for those high in Conscientiousness and reciprocity works well for extroverted, conscientious, agreeable and neurotic individuals [24,61].

Finally, some studies have investigated how personality moderates the effectiveness of some arguments. For instance, in the context of voter mobilization, individuals high in Openness tend to be broadly persuadable, responding positively not only to social pressure messages, such as reminders that voting records are public, but also to civic duty appeals that emphasized the responsibility of participation. By contrast, individuals high in Extraversion and Agreeableness appear less responsive to social pressure arguments, while those high in Conscientiousness were similarly unpersuaded by such tactics but more likely to react to appeals grounded in civic duty, consistent with their strong sense of personal responsibility. These findings highlight that the same persuasive messages may have divergent effects depending on the personality profile of the recipient [44].

Collectively, these findings highlight that audience characteristics, whether motivational, attitudinal, cultural or personality-based, can shape the effectiveness of persuasive messages. While such matching frameworks are not always easy to operationalize in practice, they provide health practitioners with valuable tools for refining communication strategies and increasing the likelihood of behavioural impact.

5. Conclusion

Understanding audience characteristics and aligning message designs accordingly is not merely a matter of refinement, it can be a decisive factor in whether communication produces meaningful engagement and behavioral change, a critical issue in health context. Indeed, better communication, and especially personalised communication, can improve adherence, prevention uptakes, and health related behaviors. These findings suggest that personalisation is not simply a courtesy to the patient, it is a strategic necessity for maximizing the efficacy of health communication and more broadly for improving the overall care pathway. In universal healthcare systems, where cost is not a primary concern for patients, these improvements can also translate into reduced healthcare utilisation or a shift toward less resource-intensive care.

However, one major barrier in personalised communication is the investment it requires, in time and cognitive resources, to assess audience characteristics and determine the most appropriate matching principle to apply. The next challenge, therefore, is to design practical, evidence-based tools that enable healthcare providers to quickly assess these characteristics and adapt their messages accordingly. This challenge extends beyond individual consultations, it also applies to public health professionals designing large-scale prevention and health promotion campaigns targeting population-level health behaviours rather than clinical pathologies. Algorithmic matching systems capable of

processing audience data and selecting the most effective communication strategies could bridge the gap between scientific knowledge and ecological implementation [62,63]. Social media environments can appear as an interesting tool, whereby multiple message framings may reach different audiences through algorithmic curation. Nevertheless, this diffusion-based targeting does not substitute for theory-driven message design and raises ethical concerns, as internautes are not fully aware of the data collected and the functioning of the algorithms.

Recent advances in artificial intelligence (AI), and in particular large language models (LLMs), open the way for scaling up personalised health communication. Unlike static campaigns, conversational AI can provide interactive, real-time answers tailored to each individual's questions and concerns. Evidence is accumulating across domains: vaccine chatbots have been shown to improve attitudes and intentions when designed to feel natural and credible [64], with experiments demonstrating increased vaccination intentions after interacting with a COVID-19 chatbot in France [65], and school-based trials showing that chatbot interventions improved adolescents' vaccination knowledge and attitudes beyond standard curricula [66]. Beyond vaccination, GPT-4 dialogues have been found to reduce conspiracy beliefs by about 20%, with effects persisting for months [67], while smoking-cessation chatbots have supported quit attempts and sustained user engagement [68]. These examples illustrate how AI can scale up personalisation.

Yet, patients generally express lower confidence in medical AI than in human providers, perceiving it as less capable of accounting for individual circumstances and therefore more prone to error. Still, research shows that this resistance can be mitigated precisely when AI delivers personalised recommendations [69].

Finally, note that most of these applications have focused on tailoring information to users' beliefs and misconceptions, but the same technology could be extended to other individual dimensions, such as personality traits, values, or motivational orientations, allowing health messages to be aligned not only with what people believe, but also with how they think and what they care about. If deployed responsibly, they could transform public health communication by making it more adaptive.

Credit roles

Avenel: Conceptualization; investigation, writing - original draft.
Chevallier: Supervision, writing - review, validation.
Dubourg: Supervision, writing - review and editing, validation.

Declaration of competing interest

None related to this manuscript.

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